

WHAT IS CLAIMED IS:

1. Optical communications apparatus, comprising:
a first coherent light source adapted to produce first electromagnetic radiation;
5 and
an atomic medium adapted to substantially alter the speed of propagation of said first electromagnetic radiation therethrough;
wherein said first electromagnetic radiation is used to transfer information from one location to at least one second location.
- 10 2. The apparatus of Claim 1, wherein said medium comprises at least in part sodium (Na) atoms.
3. The apparatus of Claim 1, wherein said medium comprises at least in part Rubidium (Rb) atoms.
4. The apparatus of Claim 1, further comprising a second coherent light
15 source, said second light source adapted to produce second electromagnetic radiation, said second electromagnetic radiation cooperating with said atomic medium to provide said altering of said speed of propagation.
5. The apparatus of Claim 4, wherein said apparatus comprises a delay
20 device adapted to selectively delay the propagation of said first electromagnetic radiation to said at least one second location.
6. The apparatus of Claim 4, wherein said apparatus comprises an optical switch adapted to selectively switch a device from one state to another.
7. A method of conditioning light energy in an optical communication
25 system, comprising:
providing first electromagnetic radiation having a plurality of information associated therewith;
providing second electromagnetic radiation;
providing an atomic medium;
irradiating said atomic medium with said first electromagnetic radiation; and
30 selectively irradiating said medium with said second radiation, said second

radiation at least in part controlling the propagation of said first radiation through said medium;

wherein said act of selectively irradiating comprises controlling the application of said second radiation to said atomic medium based on receiving input from said
5 communication system.

8. The method of Claim 7, wherein said act of receiving input comprises receiving information relating to the dispersion of light energy pulses within said system.

9. The method of Claim 7, further comprising diverting at least a portion of
10 said first radiation for propagation within said communication system apart from said atomic medium.

10. The method of Claim 9, wherein said act of receiving input comprises receiving information relating to the dispersion of said at least portion of said first radiation.

15 11. A method of obtaining information from light energy, comprising:
providing first electromagnetic radiation having a plurality of information associated therewith;

providing second electromagnetic radiation;
providing third electromagnetic radiation;
20 providing an atomic medium;
irradiating said atomic medium with said first electromagnetic radiation; and
selectively irradiating said medium with said second radiation so as to alter the propagation speed of said first radiation within said medium;
interrogating said medium using said third radiation; and
25 obtaining said information from said first radiation based on the interaction of at least said third radiation with said first radiation.

12. The method of Claim 11, further comprising generating at least one light pulse based on said act of obtaining.

13. The method of Claim 12, further comprising transmitting said at least
30 one light pulse over an optical communications system.

14. The method of Claim 13, further comprising controlling said acts of selectively irradiating and transmitting said at least one light pulse over said system so as to create a desired temporal relationship between said first radiation and said at least one light pulse.

5 15. Optical pulse conditioning apparatus, comprising:
a medium adapted to receive modulated light energy from a first light source;
a second source of electromagnetic energy adapted to irradiate at least a portion of said medium using electromagnetic energy, said electromagnetic energy altering the propagation of said modulated light energy through said medium; and
10 controller apparatus operatively controlling said irradiation of said medium by said electromagnetic energy so as to control at least one physical parameter of said modulated light energy.

16. The apparatus of Claim 15, wherein said at least one parameter comprises pulse width.

15 17. The apparatus of Claim 15, wherein said at least one parameter comprises the chromatic content of said modulated light energy.

18. The apparatus of Claim 15, wherein said at least one parameter comprises the amplitude of at least one constituent wavelength of energy within said modulated light energy.

20 19. The apparatus of Claim 15, wherein said controller apparatus comprises a digital data processor.

20. The apparatus of Claim 19, further comprising an optical modulator operatively coupled to said processor, said modulator adapted to modulate said electromagnetic energy based on signals received from said processor.

25

30